

APPENDIX A: METHODOLOGY

I. BIOBASED FUELS, POWER, AND PRODUCTS

The following describes the methodology and sources used to develop the fact sheet data tables on sales, employment, capacity, and number of facilities for the biopower, biofuels, and biobased products categories.

A. Power

Definition – This category includes facilities that produce electric power by using biomass as a primary or secondary feedstock or by co-firing biomass with a traditional fuel.

1. Power Sales and Employment

Facilities were identified from the Department of Energy, National Renewable Energy Laboratory's (NREL), [Renewable Electric Plant Information Service](#) (REPIS) 1999 Edition. From REPIS, plants included were classified as having a biomass fuel. These fuels sources included agricultural residues (waste), biogas, energy crops (closed loop), municipal solid waste (including industrial and medical), and timber residues (milling and logging residues). The [Integrated Waste Services Association](#) database was used as an additional source to identify municipal solid waste facilities. The U.S. EPA, [Landfill Methane Outreach Program](#) database was used as an additional source to identify landfill gas facilities.

Power sales and employment data reflect total reported sales and employment at each facility in the state. Few corporations or municipalities report sales or employment such that biomass activities can be separated out from the rest of their activities. For facilities that generate biopower and power from non-biomass sources, sales data represent total sales from both resources. For facilities that produce biopower as a byproduct of a manufacturing process, for either internal use or for sale to the grid, the entire sales from the facility, including non-power related sales, are included. This methodology was selected in order to provide an indication of the total value of economic activity impacted by the use of biomass resources for power generation.

The total number of identified biopower facilities is shown in Table A-1. Each of these facilities was researched on [Dunn and Bradstreet](#) to collect sales and employment estimates. When Dunn and Bradstreet information was not available at the facility level, BCS, Incorporated telephoned individual facilities and acquired sales and employment data. Table A-1 also shows the success rate of that data collection effort. For landfill gas facilities sales are estimated to be \$1.1 million per facility and employment is estimated to be 1 employee per facility.

Table: A-1
Biopower Facility Data Collection

Number of Facilities	Sales Information Collected or Calculated	Employment Information Collected or Calculated
1101	58%	58%

2. Power Capacity and Number of Facilities

The estimated number and capacity of biopower facilities in each state was obtained from the [REPIS](#). REPIS is a database maintained by the National Renewable Energy Laboratory for the Office of Energy Efficiency and Renewable Energy at the U.S. Department of Energy. The facilities in REPIS come from a variety of sources; a full list of the sources is available in the REPIS supporting literature.

B. Fuels

Definition - This category includes information on facilities that produce ethanol or biodiesel. It does not include information on distribution facilities at either the wholesale or retail level.

1. Fuels Sales and Employment

Ethanol and biodiesel production and distribution facilities were identified using an ethanol plant list from the [Renewable Fuels Association](#) (RFA), an ethanol fueling site list from the [Alternative Fuels Data Center](#), and biodiesel manufacturers and distributors lists from the [National Biodiesel Board](#) (NBB).

Fuels sales and employment data are total reported sales and employment at each facility, except for fueling facilities. Due to the integration of biofuels production with other activities at many facilities, it was not possible to isolate the biofuels production component from total sales and employment. Therefore, if a facility produces a biofuel as a by-product of a manufacturing process, the sales and employment figures represent the total sales and employment at that facility. At fueling facilities, an estimate of 1 employee and \$1 million in sales per facility was used.

The total number of identified biofuels facilities is shown in Table A-2. Each of these facilities was researched on Dunn and Bradstreet to collect sales and employment estimates. When Dunn and Bradstreet information was not available at the facility level, BCS, Incorporated telephoned individual facilities and acquired sales and employment data. Table A-2 also shows

the success rate of that data collection effort.

2. Fuels Capacity and Number of Facilities

The estimated number and capacity of biofuels facilities in each state was identified using an ethanol plant list from the [RFA](#) and a biodiesel manufacturers list from the [NBB](#).

Table: A-2
Biofuel Facility Data Collection

Number of Facilities	Sales Information Collected or Calculated	Employment Information Collected or Calculated
346	86%	86%

C. Products

Definition - This category follows the definition of biobased products used by the Biomass Research and Development Technical Advisory Committee in its December 2001 recommendations to the Secretaries of the U.S. Department of Energy and the U.S. Department of Agriculture. The recommendations are available at <http://www.bioproducts-bioenergy.gov/>. Biobased product companies are defined as those that manufacture products made from “any organic matter that is available on a renewable or recurring basis, including agricultural crops and trees, wood and wood wastes and residues, plants (including aquatic plants), grasses, residues, fibers, and animal wastes, municipal wastes, and other waste materials.” However, biobased product companies do not include those companies that only produce products that are conventionally made from biomass including: paper, lumber, and other conventional wood products; food, food ingredients, and food by-products; pharmaceuticals and “nutraceuticals;” and textiles from natural fibers.

1. Biobased Products Sales and Employment

Biobased products facilities in this section were identified through a number of sources including the [United Soybean Board](#), the [New Uses Council](#), the [Carbohydrate Economy](#), and BCS, Incorporated in-house sources.

The total number of identified biobased products facilities is shown in Table A-3. Each of these facilities was researched on [Dunn and Bradstreet](#) to collect sales and employment estimates. When Dunn and Bradstreet information was not available at the facility level, BCS, Incorporated staff telephoned individual facilities and acquired sales and employment data. Table A-3 also

shows the success rate of that data collection effort.

Sales and employment data reflect total sales and employment at each facility. For facilities that produce both biobased products and traditional products, the entire sales from the facility, including non-biobased products related sales, are included. This methodology was selected in order to provide an indication of the total value of economic activity associated with the production of biobased products.

2. Biobased Products Capacity and Number of Facilities

Two hundred and eight biobased products facilities were identified through a number of sources including the [United Soybean Board](#), the [New Uses Council](#), the [Carbohydrate Economy](#), and BCS, Incorporated in-house sources. Capacity data is not reported for biobased products since the complexity of totaling data between different types of biobased products such as solids, liquids, dispersions, blends, concentrations, etc., would have obscured the meaning of the data.

Table: A-3
Biobased Products Facility Data Collection

Number of Facilities	Sales Information Collected or Calculated	Employment Information Collected or Calculated
208	51%	51%

II. BIOMASS RESOURCES

A. Commodity Crops

Corn, wheat, rice, and soybean acreage and production data was taken from the U.S. Department of Agriculture, National Agricultural Statistics Service, "[Crop Production: 2001 Summary](#)," January 2002, as noted below:

Corn Acres Planted:	"Area Planted for All Purposes and Harvested for Grain by State and United States, 1999-2001," "Area Planted for All Purposes - 2001, Page 4."
Corn Bushels Produced:	"Corn for Grain: Yield and Production by State and United States, 1999-2001" "Production - 2001, Page 5."
Wheat Acres Planted:	"All Wheat: Area Planted and Harvested by State and United States, 1999-2001," "Area Planted - 2001, Page 12."
Wheat Bushels Produced:	"All Wheat: Yeild and Production by State and United States, 1999-2001," "Production - 2001, Page 13."
Rice Acres Planted:	"Rice: Area Planted and Harvested by Class, State, and United States, 1999-2001," "Area Planted - All - 2001, Page 18."
Rice Tons Produced:	"Rice: Yeild and Production by Class, State, and United States, 1999-2001," "Production - All - 2001 Page 19." Note: In the USDA source, production is reported in Cwt. 20 Cwt (Hundredweight) = 1 ton.
Soybeans Acres Planted:	"Soybeans for Beans: Area Planted and Harvested by State and United States, 1999-2001," "Area Planted - 2001," Page 34."
Soybeans Bushels Produced:	"Soybeans for Beans: Yeild and Production by State and United States, 1999-2001," "Production - 2001," Page 35."

B. Conservation Reserve Program (CRP)

CRP acreage data was taken from the U.S. Department of Agriculture, Farm Service Agency, Conservation Reserve Program "[Monthly CRP Acerage Report, Summary of Active and Expiring CRP Cropland Acres by State](#)" June 31 2001. The data presented includes all acreage enrolled in the program as of 9/30/2002. Please note that not all of this acreage is actually available for biomass production.

C. Municipal Solid Waste (MSW)

Municipal solid waste tonnage data by state was taken from the Journal "[BioCycle](#)," December, 2001 issue, page 45. The data presented includes all MSW generated in the state. Please note that not all MSW is actually available as a biomass resource due to the existence of recycling.

D. Forest Land

Forest land acreage data includes all Federal, State, County, Municipality, and privately owned forest land area. Data was taken from the U.S. Department of Agriculture, Forest Service, Forest Inventory and Analysis, 2002 Resources Planning Act Assessment: The United States Forest Resource Current Situation, "[Forest Resources of the United States - April 2002](#)," Table-1.

E. Poultry

Poultry data includes the number of broilers, turkeys, and layers in each state. Broiler and turkey data was taken from the U.S. Department of Agriculture, National Agricultural Statistics Service, "[Poultry - Production and Value: 2001 Summary](#)," April 2002, pages 5 and 7. Layers data was taken from U.S. Department of Agriculture, National Agricultural Statistics Service, "Chickens and Eggs: 2001 Summary," January 2002, page 2.

F. Livestock

Livestock data includes the number of hogs, pigs, and cattle in each state. Data on hogs and pigs was taken from U.S. Department of Agriculture, National Agricultural Statistics Service, "[Hogs and Pigs](#)," December 30, 2002, page 6. Cattle data was taken from U.S. Department of Agriculture, National Agricultural Statistics Service, "[Cattle](#)," February 2002, page 4.

III. BIOMASS RD&D AND PARTNERS

A. Projects

The research development and demonstration projects in each of the state fact sheets are projects funded by member agencies of the Interagency Biomass Research and Development Board: Department of Energy, Department of Agriculture, Office of Federal Environmental Executive, Department of the Interior, National Science Foundation, Office of Science and Technology Policy, and the Environmental Protection Agency. Each agency was investigated, and the projects which fund research development or demonstration in those agencies are included in this report.

Biomass projects were identified through BCS, Incorporated research of publicly available databases and through program-level research. The following data sources were used:

U.S. Department of Agriculture - Current Research Information System [<http://cris.csrees.usda.gov/>] and program level research.

U.S. Department of Energy - Industrial Project Locator [<http://iplocator.y12.doe.gov/>], and program level research.

National Science Foundation - [<https://www.fastlane.nsf.gov/a6/A6SrchAwdf.htm>] and program level research.

Environmental Protection Agency - Industrial Project Locator [<http://iplocator.y12.doe.gov/>], and program level research.

U.S. Department of Commerce - Program level research.

Projects are assigned to states in which the lead partners performing the project are located. More information on the projects can be obtained by clicking on the individual project title in the web-based pdf state factsheet.

B. PARTNERS

Partners listed on each state fact sheet are those companies, universities, and organizations located in the state that are participating in one or more of the research projects listed for that state.

IV. LINKS TO DATA

REPIS - <http://www.eere.energy.gov/repis/>

Integrated Waste Services Association - <http://www.wte.org>

Landfill Methane Outreach Program - <http://www.epa.gov/lmop/>

Dunn and Bradstreet - <http://www.dnb.com/us/>

RFA - <http://www.ethanolrfa.org/>

Alternative Fuels Data Center - <http://www.afdc.doe.gov/>

NBB - <http://www.biodiesel.org>

United Soybean Board - <http://www.unitedsoybean.org/>

New Uses Council - <http://www.newuses.org/>

Carbohydrate Economy - <http://www.carbohydrateeconomy.org/>

Crop Production - <http://usda.mannlib.cornell.edu/reports/nassr/field/pcp-bban/>

CRP Acreage - <http://www.fsa.usda.gov/crpstorpt/05approved/MEPEGGR1.HTM>

MSW - <http://www.biocycle.net>

Forest Land -

http://www.ncrs.fs.fed.us/4801/fiadb/rpa_tabler/Draft_RPA_2002_Forest_Resource_Tables.pdf

Poultry - <http://usda.mannlib.cornell.edu/reports/nassr/poultry/pbh-bbp/>

Livestock -

Cattle - <http://usda.mannlib.cornell.edu/reports/nassr/livestock/pct-bb/>

Hogs and Pigs - <http://usda.mannlib.cornell.edu/reports/nassr/livestock/php-bb/>